



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,271	07/02/2003	Eldon D. Dalrymple	2002-IP-007945	4083

7590

09/21/2005

Robert A. Kent
Halliburton Energy Services
2600 South 2nd Street
Duncan, OK 73536

EXAMINER

FULLER, BRYAN A

ART UNIT

PAPER NUMBER

3676

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/612,271

Applicant(s)

DALRYMPLE ET AL.

Examiner

Bryan A. Fuller

Art Unit

3676

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1 - 40 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-29 and 33-40 is/are rejected.
7) ☒ Claim(s) 30-32 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/2/03, 9/7/04, 11/22/04, 4/15/05
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

This action is a supplemental office action addressing claims 19 – 40, which were not examined in the original office action. The incomplete office action was brought to my attention by a call from Todd Albanesi on Thursday, September 1, 2005.

Claim Objections

1. Claim 1 is objected to because of the following informalities: Claim 1(a) refers to a “hydrophobically-modified RPM.” This is a very common acronym typically used for revolutions per minute. This objection can be overcome if the acronym, RPM, was in parentheses and the words it stands for specifically used in claim 1. This would not be necessary in the subsequent claims. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 – 10, 14, 15, 18, 20 – 29, 33, and 35 - 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Weaver et al (4,532,052).

With respect to claims 1 and 2: Weaver et al teaches in column 5, lines 1 – 61 and column 20, line 65 – column 22, line 36 a method of stimulating a subterranean formation by introducing an aqueous fluid containing a hydrophobically-modified

Art Unit: 3676

polymer and also introducing an acidizing fluid. The hydrophobically-modified polymer is a reaction product of various hydrophilic and hydrophobic polymers.

With respect to claim 3: Weaver et al teaches in column 14, lines 52 – 59 a hydrophilic polymer containing reactive amino groups in the polymer backbone or as pendant groups.

With respect to claim 4: Weaver et al teaches in column 11, lines 61 – 66 that the hydrophilic polymer can be a homopolymer or copolymer.

With respect to claims 5 – 7 and 9 - 10: Weaver et al teaches in column 19, line 67 – column 20, line 29 polymers with dialkyl amino pendant groups and alkyl acrylate polymers. More specifically, the reference teaches the use of dimethylaminoethyl methacrylate (DMAEMA), which is a monomer that contains a dimethyl amino pendant group. The reference also includes the polymers containing the previously described monomers.

With respect to claim 8: Weaver et al teaches in column 32, lines 12 – 15 the use of polyethyleneimine as the polymer.

With respect to claim 14: Weaver et al teaches in column 20, line 68 – column 21, line 13 that the hydrophobically-modified polymer is dissolved in an aqueous solution and then injected into the formation.

With respect to claim 15: Weaver et al teaches in column 10, lines 33 – 36 that the hydrophobically-modified polymer, made of the hydrophilic polymer and the hydrophobic compound, can be formed in situ.

With respect to claim 18: Weaver et al teaches in column 22, lines 14 – 36 the use of a surfactant to promote the above mentioned method.

With respect to claim 20: Weaver et al teaches in column 45, lines 34 – 39 a method wherein the surfactant is present within the aqueous solution in amounts ranging from about 0.1 % to about 2% by weight.

With respect to claims 21 and 28: Weaver et al teaches in column 5, lines 29 – 37 a method wherein the hydrophobically-modified RPM is a polymeric material having molecular weights in the range of about 250,000 to about 3,000,000.

With respect to claim 22: Weaver et al teaches in column 21, lines 15 – 25 a method wherein the hydrophobically-modified RPM is present in the aqueous treatment fluid in a concentration from about 0.02% to about 3% by weight.

With respect to claim 23: Weaver et al teaches in column 21, lines 15 – 25 a method wherein the hydrophobically-modified RPM is 2 present in the aqueous treatment fluid in a concentration from about 0.05% to about 1% by weight.

With respect to claim 24: Weaver et al teaches in column 21, lines 57 - 62 a method wherein the aqueous treatment fluid is at a pH of between about 4 and about 8.

With respect to claim 25: Weaver et al teaches in column 5, lines 43 – 46 a method wherein the hydrophobically-modified RPM polymer is prepared from the polymerization reaction of at least one hydrophobic monomer and at least one hydrophobically-modified hydrophilic monomer.

With respect to claim 26: Weaver et al teaches in column 19, line 66 – column 20, line 29 a method wherein the hydrophilic monomer is selected 2 from the group

Art Unit: 3676

consisting of acrylamide, z-acrylamido-z-methyl propane sulfonic acid, 3 N,N-dimethylacrylamide, vinyl pyrrolidone, dimethylaminoethyl methacrylate, acrylic acid, dimethylaminopropylmethacrylamide, vinyl amine, vinyl acetate, trimethylammoniummethyl methacrylate chloride, methacrylamide, and hydroxyethyl acrylate.

With respect to claim 27: Weaver et al teaches in column 19, line 36 – column 20, line 29 a method wherein the hydrophobically-modified hydrophilic monomer is selected from the group consisting of alkyl acrylates, alkyl methacrylates, alkyl acrylamides and alkyl methacrylamides wherein the alkyl radicals have from about 4 to about 22 carbon atoms, alkyl dimethylammoniummethyl methacrylate bromide, alkyl dimethylammoniummethyl methacrylate chloride and alkyl dimethylammoniummethyl methacrylate iodide wherein the alkyl radicals have from about 6 to about 22 carbon atoms and alkyl dimethylammoniumpropyl methacrylamide bromide, alkyl dimethylammoniumpropyl methacrylamide chloride, and alkyl dimethylammoniumpropyl methacrylamide iodide, wherein the alkyl groups have from about 4 to about 22 carbon atoms.

With respect to claim 29: Weaver et al teaches in column 7, lines 20 – 30 a method wherein hydrophobically-modified RPM has 2 mole ratios of the hydrophilic monomer(s) to the hydrophobically-modified hydrophilic monomer(s) in the range of from about 99.98:0.02 to about 90:10.

With respect to claim 33: Weaver et al teaches in column 22, lines 28 – 36 a method wherein the hydrophobically-modified RPM the well after introducing the polymeric material into the well.

With respect to claims 35 and 38: Weaver et al teaches in column 6, lines 29 – 37, in column 15, lines 33 – 40, in column 19, line 37 – column 20, line 47, and in column 22, lines 28 – 36 a method of acidizing a subterranean formation penetrated by a well comprising the steps of: (a) introducing into the formation an aqueous treatment fluid containing from about 0.02% to about 3% by weight of a water-soluble, hydrophobically-modified RPM that is the reaction product of a hydrophilic polymer and a hydrophobic compound that are capable of reacting with each other, wherein the hydrophilic polymer is a polymer containing reactive amino groups in the polymer backbone or as pendant groups, which are capable of reacting with a hydrophobic alkyl halide compound having an alkyl chain length of 6 to 22 carbons; and (b) introducing an acidizing treatment fluid into the formation.

With respect to claims 36 and 39: Weaver et al teaches in column 5, lines 29 – 35 and in column 21, lines 13 – 25 a method wherein the hydrophobically-modified RPM is dissolved in an aqueous solution and then injected into the formation.

With respect to claims 37 and 40: Weaver et al teaches in column 10, lines 33 – 36 a method wherein the hydrophobically-modified RPM is 2 introduced into the formation by mixing the hydrophilic polymer and the hydrophobic alkyl halide compound in the aqueous treatment fluid in situ during the well stimulation process.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1 – 10, 14, 15, and 18 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Card et al (5,979,557) in view of Weaver et al.

With respect to claim 1: Card et al teaches in column 4, lines 40 – 52 a method comprising: step for selectively blocking the pore structure in the water-bearing zone at the formation face to selectively retard migration of acid into the water-bearing zone and allow migration into the hydrocarbon zone: and injecting acid into the formation, wherein the acid is diverted from the water-bearing zone to the hydrocarbon zone as a result of selectively blocking the pore structure in the water-bearing zone at the formation face. Weaver et al teaches the features as previously described and the improvement of fluids used to reduce the flow of aqueous fluids into or out of the formations. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Card et al in view of Weaver et al and introduce a hydrophobically-modified polymer and introduce an acid to stimulate a subterranean formation. The motivation for this combination is that the compositions for altering fluid properties or treating various substrates can be formulated to produce the combination of composition properties desired.

With respect to claim 2: Card et al teaches the features as previously described. Weaver et al teaches in column 5, lines 54 – 61 the reaction product of a hydrophilic polymer and a hydrophobic compound. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Card et al in view of Weaver et al and introduce a hydrophobically-modified polymer, which is the reaction product of a hydrophilic polymer and a hydrophobic compound. The motivation for this combination is that the compositions for altering fluid properties or treating various substrates can be formulated to produce the combination of composition properties desired.

With respect to claim 3: Card et al teaches the features as previously described. Weaver et al teaches in column 14, lines 52 – 59 a hydrophilic polymer containing reactive amino groups in the polymer backbone or as pendant groups. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Card et al in view of Weaver et al and introduce a hydrophobically-modified polymer containing reactive amino groups in the polymer backbone or as pendant groups. The motivation for this combination is that the compositions for altering fluid properties or treating various substrates can be formulated to produce the combination of composition properties desired.

With respect to claim 4: Card et al teaches the features as previously described. Weaver et al teaches in column 11, lines 61 – 66 that the hydrophilic polymer can be a homopolymer or copolymer. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Card et al in view of

Weaver et al and use a hydrophilic polymer that can be a homopolymer or copolymer. The motivation for this combination is that the compositions for altering fluid properties or treating various substrates can be formulated to produce the combination of composition properties desired.

With respect to claims 5 – 7 and 9 - 10: Card et al teaches the features as previously described. Weaver et al teaches in column 19, line 67 – column 20, line 29 polymers with dialkyl amino pendant groups and alkyl acrylate polymers. More specifically, the reference teaches the use of dimethylaminoethyl methacrylate (DMAEMA), which is a monomer that contains a dimethyl amino pendant group. The reference also includes the polymers containing the previously described monomers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Card et al in view of Weaver et al and use a hydrophilic polymer with dialkyl amino pendant groups and alkyl acrylate polymers, as dimethylaminoethyl methacrylate (DMAEMA), which is a monomer that contains a dimethyl amino pendant group, or with polymers containing the previously described monomers. The motivation for this combination is that the compositions for altering fluid properties or treating various substrates can be formulated to produce the combination of composition properties desired.

With respect to claim 8: Card et al teaches the features as previously described. Weaver et al teaches in column 32, lines 12 – 15 the use of polyethyleneimine as the polymer. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Card et al in view of Weaver et al and

Art Unit: 3676

use polyethyleneimine as the hydrophilic polymer. The motivation for this combination is that the compositions for altering fluid properties or treating various substrates can be formulated to produce the combination of composition properties desired.

With respect to claim 14: Card et al teaches the features as previously described. Weaver et al teaches in column 20, line 68 – column 21, line 13 that the hydrophobically-modified polymer is dissolved in an aqueous solution and then injected into the formation. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Card et al in view of Weaver et al and dissolve the hydrophobically-modified polymer in an aqueous solution and then inject into the formation. The motivation for this combination is that the compositions for altering fluid properties or treating various substrates can be formulated to produce the combination of composition properties desired.

With respect to claim 15: Card et al teaches the features as previously described. Weaver et al teaches in column 10, lines 33 – 36 that the hydrophobically-modified polymer, made of the hydrophilic polymer and the hydrophobic compound, can be formed in situ. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Card et al in view of Weaver et al and form the hydrophobically-modified polymer in situ. The motivation for this combination is that the compositions for altering fluid properties or treating various substrates can be formulated to produce the combination of composition properties desired.

With respect to claim 18: Card et al teaches the features as previously described. Weaver et al teaches in column 22, lines 14 – 36 the use of a surfactant to promote the above mentioned method. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Card et al in view of Weaver et al and use a surfactant to promote the formation of the hydrophobically-modified polymer in situ. The motivation for this combination is that the compositions for altering fluid properties or treating various substrates can be formulated to produce the combination of composition properties desired.

6. Claims 11 – 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weaver et al in view of Szabo et al (3,744,566).

With respect to claims 11 – 13: Weaver et al teaches the features as previously described. Additionally, Weaver et al teaches in column 15, lines 33 – 40 the use of alkyl halide as a reactive site to react with other reactive sites. Szabo et al teaches in column 3, line 35 – column 4, line 23 a hydrophobic compound that is an alkyl halide having an alkyl chain length of one to 16 carbon atoms capable of quarternizing a homopolymer of dimethylaminoethyl methacrylate (DMAEMA). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Weaver et al in view of Szabo et al and use an alkyl halide having an alkyl chain length of 6 to 22 carbons that is capable of quarternizing DMAEMA, because the resistance factors obtained with these polymers were higher than those obtained with conventional RPMs.

7. Claims 11 – 13 can also be rejected under 35 U.S.C. 103(a) as being unpatentable over Card et al in view of Weaver et al as applied to claim 3 above, and further in view of Szabo et al.

With respect to claims 11 – 13: Card et al teaches the features as previously described. Weaver et al teaches the features as previously described. Additionally, Weaver et al teaches in column 15, lines 33 – 40 the use of alkyl halide as a reactive site to react with other reactive sites. Szabo et al teaches in column 3, line 35 – column 4, line 23 a hydrophobic compound that is an alkyl halide having an alkyl chain length of one to 16 carbon atoms capable of quarternizing a homopolymer of dimethylaminoethyl methacrylate (DMAEMA). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the combination of Card et al and Weaver et al in view of Szabo et al and use an alkyl halide having an alkyl chain length of 6 to 22 carbons because it is capable of quarternizing DMAEMA.

8. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weaver et al in view of Stahl et al (5,382,371).

With respect to claims 16 & 17: Weaver et al teaches the features as previously described. Stahl et al teaches in column 5, lines 52 – 62 a process for preparing the inventive polymers (the hydrophilic and hydrophobic compounds) by carrying out the polymerization in a polymerization medium, water, using monomer concentrations ranging from the minimum required to produce a polymer solution of the desired viscosity. The range given was from 0.1 weight percent up to 80 weight percent. Therefore, it would have been obvious to one of ordinary skill in the art at the time the

Art Unit: 3676

invention was made to have modified Weaver et al in view of Stahl et al and use the ranges disclosed in the inventor's application. The motivation for this combination is that the polymers are suitable for exposure to severe conditions.

9. Claims 16 & 17 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Card et al in view of Weaver et al as applied to claim 15 above, and further in view of Stahl et al.

With respect to claims 16 & 17: Card et al teaches the features as previously described. Weaver et al teaches the features as previously described. Stahl et al teaches in column 5, lines 52 – 62 a process for preparing the inventive polymers (the hydrophilic and hydrophobic compounds) by carrying out the polymerization in a polymerization medium, water, using monomer concentrations ranging from the minimum required to produce a polymer solution of the desired viscosity. The range given was from 0.1 weight percent up to 80 weight percent. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the combination of Card et al and Weaver et al in view of Stahl et al and use the ranges disclosed in the inventor's application. The motivation for this combination is that the polymers are suitable for exposure to severe conditions.

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Weaver et al in view of Harris (5,990,052).

With respect to claim 19: Weaver et al teaches the features as previously claimed except wherein a specific surfactant is used. Harris teaches in column 9, lines 35 - 45 a method wherein betaines is used as the surfactant. Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to have modified Weaver et al's invention by using betaines as the surfactant in view of Harris. The motivation for this combination is that this surfactant has a profound effect on a polymer solution's viscosity.

11. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Weaver et al in view of Dawson et al (6,228,812).

With respect to claim 34: Weaver et al teaches the features as previously claimed except for further comprising the step of shutting in the well after introducing the polymeric material into the well. Dawson et al teaches in column 14, lines 45 - 51 a method further comprising the step of shutting in the well after introducing the polymeric material into the well. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Weaver et al's invention by further comprising the step of shutting in the well after introducing the polymeric material into the well in view of Dawson et al. The motivation for this combination is that this allows maximum anchoring and retention of the disclosed copolymer compositions.

Allowable Subject Matter


12. Claims 30 – 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan A. Fuller whose telephone number is (571) 272-8119. The examiner can normally be reached on M - Th 7:30 - 5:00 and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian E. Glessner can be reached on (571) 272-6843. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Brian E. Glessner
Supervisory Patent Examiner
Art Unit 3676

baf